

Smallest shell:

Maj. diam.	17.5 mm.	17.5 mm.	15.5 mm.
Alt.	12.9 mm.	13.3 mm.	11.5 mm.
Number measured	18	8	16

This variety is the smallest of the *arrosa* group and is unusual for the relatively little variation in size among the specimens so far studied. This is all the more remarkable because of the frequent wide range in size of the "typical" form of *arrosa*, not only among specimens from different localities, but also among specimens in the same lot. The largest *arrosa* so far seen has a major diameter of 40.5 mm., which places it among the biggest of our Pacific Coast land snails. Only a few of the largest of *M. fidelis* (Gray) exceed it in size, and then only by a small margin. The smallest is the Lookingglass specimen indicated in the table (15.5 mm.).

The affinities of *mailliardi* are with *H. a. expansilabris*, which it resembles in general contour only. While it is not at all impossible that intergrades between the two varieties may be found eventually, there are good reasons at present for considering the two as distinct, at least until a thorough study can be made of the entire *arrosa* group based on a large collection of specimens taken throughout its entire range.

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## DESCRIPTIONS OF SOME LAND SNAILS OF SOUTHWESTERN NORTH CAROLINA

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The following notes and descriptions of new forms are based upon material obtained during two trips into the mountains of western North Carolina.

The junior author made a trip during August, 1930, in Cherokee, Jackson and Swain counties, North Carolina. In July, 1931, the senior author accompanied by A. F. Archer and Harold Rehder investigated the counties of Cherokee, Clay, Graham, Macon, and Swain. The second trip was made

in part to amplify the material collected on the first trip and to complete a general survey of the state of Georgia started two years ago by the senior author and Dr. P. Okkelberg.

The entire southwestern corner of North Carolina is mountainous. It is drained by several major confluent of the Tennessee River that have cut rather deep gorges through the main axis of the Appalachian Mountains. These major streams (Hiwassee, Little Tennessee, and French Broad) have probably played an important part in isolating various faunal elements that are peculiar to the higher altitudes. As yet, our knowledge is still imperfect relative to the entire mountainous sections of the southern states, though certain localized areas have been more or less intimately studied. The ranges of several species will probably be extended when a thorough and more detailed study can be made of the entire area, and there is no question but that several new forms will be discovered. It is gratifying to know that our governments, both state and federal, have taken over large areas in different parts of this region as state and national forests, and as a consequence much of the original land fauna, especially the invertebrates, will be preserved.

The authors are deeply indebted to Mr. Mack Cooper of Andrews, North Carolina, for use of a fine camp site and for much information about the region investigated.

RETINELLA (GLYPHOGNOMON) JUNALUSKANA, sp. nov.<sup>1</sup> Pl. 2, fig. 4.

*Description:* Shell minutely umbilicated, possessing the same general outline and thinness of *R. sculptilis* but only a little more than half the size of that species. Whorls 6, upper half of the shell light amber, basal area shading into yellowish horn. Sculpture consisting of axial grooves, with a beaded riblet on each side. The area in between the riblets is faintly and spirally beaded. Incised spiral lines are present on the earliest whorls, the beaded sculpture only well developed on the last two whorls. On the basal area, the grooves and beaded riblets are as equally well developed and continue into the umbilicus.

<sup>1</sup> This subspecies is named for the Indian chief, Junaluska, who had exercised control over the Cherokee Indians of this region.

	Height	Maj. Diam.	Less Diam.	Ap. Width	
M.C.Z.	3.6 mm.	6.5 mm.	6.0 mm.	4.0 mm.	Paratype
	4.0 mm.	7.5 mm.	6.7 mm.	4.6 mm.	Holotype
	3.9 mm.	7.3 mm.	6.6 mm.	4.2 mm.	Paratype
	3.7 mm.	6.6 mm.	6.0 mm.	3.8 mm.	Paratype

*Holotype*: M. C. Z. 86429. (E. 83° 47', N. 35° 12'.) Wooded slopes of small hill 2½ miles East of Andrews, Cherokee Co., North Carolina. G. S. Banks, Aug., 1930; Clench, Archer and Rehder, July, 1931, collectors. *Paratypes*: M. C. Z.; ANSP. No. 157215; Univ. of Mich., and collection of G. Banks.

*Remarks*: This new subspecies differs from *R. sculptilis subdola* Baker in possessing a darker color and having an entirely different sculpture. In *R. s. subdola* there is no trace of beading, the axial grooves are wider, and the spiral sculpture is very strong on the last whorl. (Sculpture characters obtained with Spencer binocular 12.5 eyepiece, 3.4 ocular.)

POLYGYRA (STENOTREMA) VOLUMINOSA, sp. nov. Pl. 2, figs. 6, 7.

Shell imperforate, medium in size, globose, quite thin. Color reddish brown, occasionally albinistic forms are found. Whorls 5⅔, body whorl strongly convex, equally rounded above and below with no trace of a keel. Spire low, very flatly cone shaped; the entire spire slightly convex. Aperture transverse, and nearly straight. Its area materially reduced by the large recurved parietal tooth. Palatal lip entirely free, and not connected with the parietal tooth as in most species in this group. Basal margin of the palatal area with a deep, fairly wide notch. Upper portion of the palatal area is more or less cut back, leaving the lip rather thin at its attachment to the body whorl. This area of the lip bends down sharply, as in other species of this group. Parietal tooth very large, well rounded, and recurved towards the basal area of the lip. It overlaps the insertion of the peristome, producing a pocket at the umbilical depression. It terminates inside of the aperture, just behind the lip margin, when viewed from the side. Within the body whorl, the columellar plate which extends backwards, has on its free

end a recurved area. Suture only slightly depressed. Sculpture consisting of incised axial lines on the nuclear whorls, the remaining whorls covered with numerous somewhat prostrate short hair-like processes.

Height	Maj. Diam.	Less. Diam.	Ap. Width	
9.5 mm.	13.9 mm.	12.8 mm.	7.0 mm.	Holotype
9.2 mm.	13.1 mm.	12.3 mm.	6.9 mm.	Paratype
9.0 mm.	13.9 mm.	12.7 mm.	6.8 mm.	Paratype
9.0 mm.	13.5 mm.	12.4 mm.	6.8 mm.	Paratype
8.9 mm.	12.7 mm.	11.8 mm.	6.5 mm.	Paratype

*Holotype*: M. C. Z. 82530 (E. 83° 39', N. 35° 38'), Blowing Springs, Cliff Ridge, Nantahala Gorge, Swain Co., North Carolina. G. Banks, Aug., 1930; Clench, Archer, Rehder, July, 1931, collectors. *Paratypes*: M. C. Z., ANSP. No. 157684, Univ. of Mich., and the collections of A. Archer, G. Banks, and H. Rehder.

*Remarks*: The profile view of this species is almost identical with *P. brevipila* Clapp, but *P. voluminosa* is much larger, has one more whorl, and the basal notch is distinctly an indentation in the center of the lip. From *P. stenotrema* Fér. our species differs in its larger size, non-angular body whorl, very hirsute surface, and recurved columellar plate.

In relationship it seems to be nearest to *P. brevipila* and both of these forms may have evolved from some common ancestral stock, though they are now separated by about 200 miles of territory.

POLYGYRA (TRIODOPSIS) NANTAHALA, sp. nov. Pl. 2, figs. 1-3 and 5.

*Description*: Shell 17 to 18 mm. in width, subglobose; imperforate; moderately heavy, translucent. Color, reddish horn, shining. Whorls, 5½, strongly convex, rounded and finely though definitely angular on the body whorl. Spire depressed, rounded or dome shaped. Suture, indented. Aperture, lunate, peristome white, and sharply reflected; on the basal portion of the peristome there is a small tooth, produced by a continuous thickening of the peristome. Nearly one-half of the way along the peristome from the umbilicus, this thickening is sharply cut down, producing this tooth-like structure. Parietal wall supporting a rather long re-



curved tooth, its highest point being directed towards the center of the aperture, its lower point towards the umbilical area. Columella inconspicuous. Sculpture of moderately coarse axial ridges, becoming finer on the earlier whorls but including this same sculptural character on the nuclear whorl. These axial striae cover the entire body whorl from the suture to the umbilical area, but are interrupted at the angle by Y-shaped ridges. Under a lens there are no spiral striae. The under surface of the body whorl is slightly malleated.

Height	Maj. Diam.	Less. Diam.	Ap. Width	
11.0 mm.	17.7 mm.	15.0 mm.	7.3 mm.	Holotype
11.2 mm.	18.2 mm.	16.0 mm.	8.3 mm.	Paratype
11.6 mm.	17.8 mm.	15.2 mm.	Broken	Paratype
11.1 mm.	17.2 mm.	14.7 mm.	7.0 mm.	Paratype
11.6 mm.	17.7 mm.	15.2 mm.	7.5 mm.	Paratype

*Holotype*: M. C. Z. 86429 (E.  $83^{\circ} 39'$ , N.  $35^{\circ} 38'$ ), Blowing Springs, Cliff Ridges, Nantahala Gorge, Swain Co., North Carolina. G. Banks, Aug., 1930; Clench, Archer, Rehder, July, 1931, collectors. *Paratypes*: M. C. Z., ANSP. No. 153664, Univ. of Mich., and the collections of A. Archer, G. Banks, and H. Rehder.

*Remarks*: This species is a member of the group to which belongs *P. elevata* Say, *P. clarkii* Lea, and *P. pennsylvanica* Green. In relationship it is nearest to *P. clarkii*, but differs materially in several of its characters. *P. nantahala* is much larger, and proportionally is not so elevated, and possesses a greater amount of sculpture on the nuclear whorl. The aperture and tooth structures of the two species is similar other than size, though the parietal tooth of *P. nantahala* is proportionally longer.

In addition to the new forms, numerous other shells obtained in this region will be enumerated in the next issue of NAUTILUS.